

NVO 187

NVO 187

# PROJECT RULISON

## WELL PLUGGING AND SITE ABANDONMENT FINAL REPORT



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SEPTEMBER 1977

PREPARED BY THE ENERGY RESEARCH  
PROJECTS BRANCH

UNITED STATES  
ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION  
NEVADA OPERATIONS OFFICE

AUSTRAL OIL COMPANY

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APPENDIX A

APPENDIX B

## I. INTRODUCTION

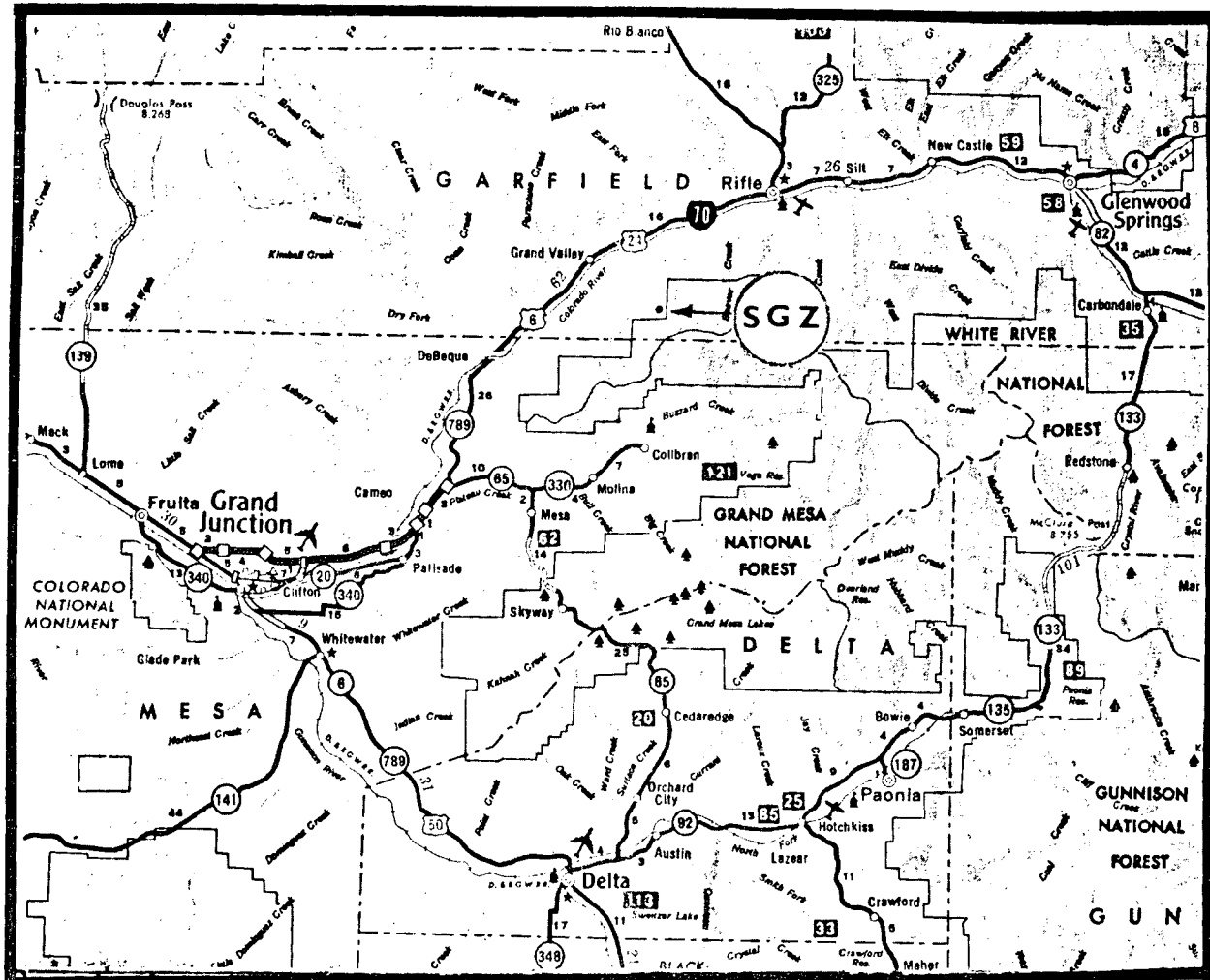
### A. General

Project Rulison, the second nuclear explosive gas stimulation experiment, cosponsored by the U.S. Atomic Energy Commission (now the U.S. Energy Research and Development Administration, ERDA) and the Austral Oil Company, was designed to determine the potential increase in production by using a nuclear explosive to stimulate and enhance natural gas recovery in the Mesaverde formation of the Rulison gas field, Garfield County, Colorado. (See location map, Figure 1.)

On September 10, 1969, under the technical direction of the Los Alamos Scientific Laboratory (LASL), a 43-kiloton fission-type nuclear explosive was detonated at a depth of 8,426 feet in an emplacement well (designated R-E) on Colorado's western slope. Reentry drilling operations, through a separate reentry well (designated R-EX) located 300 feet southeast of the emplacement well, began in April and were completed in July of 1970. This reentry was designed to production test the stimulated zone (Figure 2).

Production testing took place over a seven-month period and included four separate flow periods. Between October 1970 and April 1971, approximately 455 million standard cubic feet (MMSCF) of chimney gas was produced. The well was shut in after the last test in April 1971 and left in a standby condition until a general cleanup was undertaken in 1972. This work began on July 10, 1972, and was completed on July 25, 1972. The purpose was to decontaminate, if necessary, and remove from the site all equipment and materials not needed for possible future gas production. The task was accomplished and the radiological condition of the site documented by extensive sampling of the equipment and soil. The Rulison Site Cleanup Report, NVO 136, September 1973, is recommended for details of the project.

The Rulison well (RE-X) had been shut in since April 1971, and because neither the Austral Oil Company nor ERDA had any plans to commercially



0 5 10 15  
SCALE IN MILES

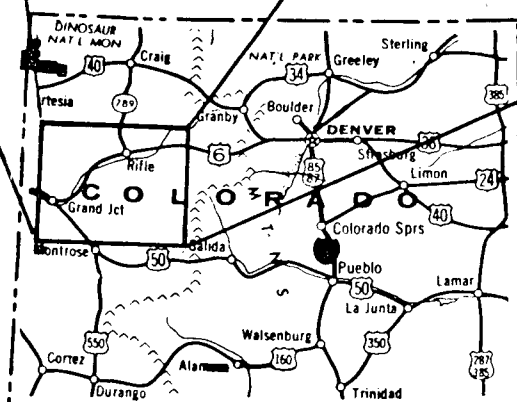


Figure 1  
Location Map - Project Rulison

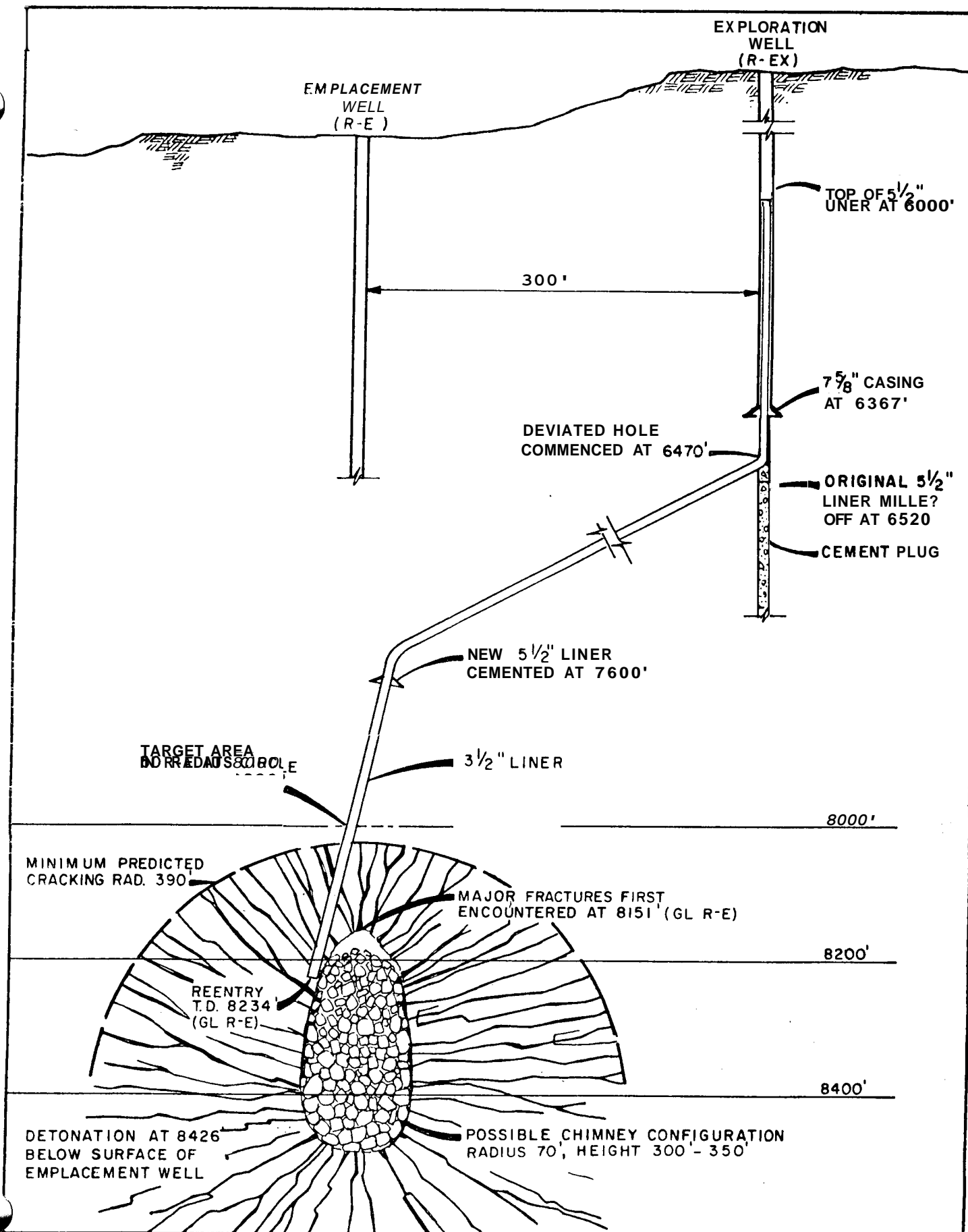


FIGURE 2 Project Rulison Emplacement and Re-Entry Well Configuration



produce the available chimney gas, the wells were plugged and abandoned and all equipment removed. This course of action had been mutually agreed upon by both parties and is within the provisions of ERDA Contracts E(26-1)-429 and E(26-1)-667 with the Austral Oil Company, Inc.

This document, in the following sections, is designed to be used in conjunction with NVO 174 (Rev. 1), the Project Rulison Well Plugging and Site Abandonment Plan, August 1976. NVO 174 (Rev. 1) describes in detail the methods and procedures that were to be used in implementing a plugging and abandonment procedure for the Rulison wells and site. This final report compares the planned actions with the actual disposition of the various tasks and operations. Those activities which departed substantially from the original plan of operation are described along with the operations that occurred as planned. The disposal of all radiological materials is discussed comprehensively in the Rulison Radiation Contamination Clearance Report PNE-R-68 dated June 1977 by the Eberline Instrument Corporation.

## B. Implementation of Demobilization and Site Abandonment

### 1. Wells

The Rulison wells, R-E and R-EX, were plugged and abandoned in a **manner which was consistent with good oil field engineering practices** and approved by both the State of Colorado and the U.S. Geological Survey, Division of Oil and Gas. See Appendix A, Approvals. This procedure involved plugging in such a manner as to permanently prevent gas or water migrations from one formation to another.

The plugging procedures for the R-EX well were performed as planned with the exception that the section between 5,460 feet and 3,000 feet was cemented in lieu of being loaded with plugging mud. This modification was at the direction of the USGS.

The emplacement well (R-E) plugging procedure was modified from the original plan because stemming material previously specified to be removed down to a depth of 7,200 feet could be removed only to a depth of 5,954 or 1,246 feet shallower than had originally been planned because of parted casing in the well. Being unable to circulate cement in the casing-formation annulus, the entire well was cemented in lieu of leaving a 3,200-foot section filled with plugging mud. The details of the plugging plan are given in Section III, Site Abandonment Program. The R-E well was effectively plugged in a manner as to permanently prevent migration of gas and/or water from one formation to another.

2. Surface Plant and Equipment

The surface plant and all equipment were dismantled, decontaminated, released for unrestricted public use, and shipped off site to a location designated by the owner (Austral Oil Company) as per the plan in Section III D of NVO 174 (Rev. 1). The only materials left on the site were a power pole with fuse box, a telephone line, a concrete slab, and a small monument over the reentry well designating drilling restrictions. Those items plus portions of fence were all left at the landowner's request.

**All mud pits and other excavations were backfilled and both the upper and lower drilling pads leveled and dressed.** The landowner was consulted regarding the condition of the site prior to final departure, and indicated his satisfaction with its condition at that time. See Appendix B.

## II. CURRENT SITE STATUS

### A. Real Property

#### 1. Surface Rights

It was planned to obtain, by written agreement, the right to control drilling below a depth of 6,000 feet on Lot 11 (Rulison drilling site) and to place a monument at surface ground zero at the time of abandonment.

An agreement was negotiated and a deed subsequently executed on September 11, 1976, with Mr. Lee Hayward, owner of the surface and subsurface rights at the Rulison site. For a one-time, lump-sum payment to Mr. Hayward, the U.S. Government now has the right to regulate and control access to the subsurface by drilling or excavation (below 6,000 feet) in Lot 11 of Section 25 T7S, R95W. The surface rights comprising the Rulison site were subsequently sold by the owner and now belong to another party.

#### 2. Subsurface Rights

Under terms and conditions of the Rulison Contract, E(26-1)-429, Austral Oil Company, Inc., granted to the Government its subsurface operating rights (obtained by lease from Hayward) from the surface to a depth of 500 feet below the base of the Mesaverde formation. However, these operating rights granted to the Government terminated when Austral's lease with Hayward expired on January 23, 1977. It is the September 11, 1976, deed with Hayward that allows the Government to exercise its rights in limiting drilling activity in this area, below 6,000 feet.

## B. Wells and Surface Facilities

The following is a summary description of the disposition of those Austral-owned facilities at the completion of the plugging and abandonment of the Rulison site.

### 1. Wells

- a. R-E (Rulison Emplacement Well). The high-pressure wellhead equipment, pressure gauging instruments, and metal storage building were removed to an Austral storage facility. The combination barbed wire and cyclone fence with one locked vehicle gate was removed and left with the Rulison landowner at his request.
- b. R-EX (Rulison Reentry and Production Well). The wellhead equipment, including all valving, heater, separator, and associated equipment, was removed to an Austral-owned facility.

### 2. Surface Facilities

- a. The four-strand barbed wire protective fence enclosing the R-EX wellhead, effluent holding tanks, and separator were left in place at the request of the Rulison landowner. The three 210-barrel water tanks, a three-phase separator, a lubricator, a pipeline from wellhead to separator, a large steel drip pan, and a wireline trailer were all decontaminated and removed to an Austral-owned storage facility,.
- b. The tool and instrument shed, together with some miscellaneous piping and drip pans near the R-EX well, were removed to an Austral-owned storage facility.
- c. Existing telephone and electric power lines were left in place at the request of the Rulison landowner.

- d. The large pit in Lot 5 of Section 25 that formerly contained drilling fluids and was then converted to a freshwater holding pond, remains in this configuration for the use of, and at the request of, the Rulison landowner.

### III. SITE ABANDONMENT PROGRAM

#### A. Plugging and Abandonment Sequence of Reentry Well R-EX

1. Washed out two contaminated 210-barrel tanks. Placed contaminated soil in seven drums. Broke down and steam cleaned three 3-inch WKM gate valves. Welded on drip pans.
2. Rewashed the 210-barrel tanks, Eberline checked contamination. Resampled oil spill area which occurred while moving the separator to the decontamination pad. Additional soil was removed. Deconned all valves removed from the xmas tree. Welded three leaks in the mud tank. Completed fabricating drip pans. Moved Eberline trailer to location.
3. Released the 210-barrel tanks. Removed, cleaned, and released all xmas tree valves and miscellaneous items. Moved in Otis Engineering wire line truck and set plug in 3 1/2-inch tubing at 7,530 feet. Moved out Otis. Connected adjustable choke and flare line to well. Tubing pressure 1,600 psi. Opened well and flowed for 20 minutes. Shut in, checked pressure at 1,600 psi.
4. Rigged up GO International. Pumped 67 barrels of water down the 3 1/2-inch tubing and set a **bridge plug at 7,500 feet. Loaded** tubing with 20 barrels **of** water and pressure tested to 1,000 psi. Perforated tubing with four holes from 7,465 feet to 7,466 feet. Established circulation with 20 barrels of fluid. Circulated 140 barrels of gas cut mud out of the well. Pumped in 112 1/2 feet<sup>3</sup> of 50% Pozmix, 50% neat cement, 2% gel, and 0.4% HR-5 saturated slurry. Cement in place at 1555 hours. Calculated top of cement at 6,450 feet. Made attempts to perforate tubing from 6,400 feet to 6,401 feet and could not break down with 5,000 psi and 6,000 psi. Moved out the two 210-barrel tanks.

5. Tagged cement at 6,394 feet inside the 3 1/2-inch tubing. Perforated tubing from 6,250 feet to 6,251 feet and established circulation. Pumped 107 feet<sup>3</sup> of 50% Pozmix, 50% neat cement, 2% gel, and 0.4% HR-5 salt saturated slurry down the tubing. Cement in place 0951 hours. Calculated top of cement at 5,310 feet. Perforated the tubing from 3,000 feet to 3,001 feet and established circulation. Cemented 7 5/8-inch x 5 1/2-inch annulus and 3 1/2-inch x 5 1/2-inch annulus. Cemented 3 1/2-inch tubing to surface. Used a total of 865 feet<sup>3</sup> of cement to plug well. Cement in place at 1200 hours. Well plugged 9/11/76. See Figure 3.
6. Completed breaking down, separating, and steaming wellhead. Excavated contaminated soil for shipment and steamed off 25 barrels of fluid.
7. Resampled soil in spill area. Steamed off 25 additional barrels of fluid. Fabricated well marker.
8. Cleaned out gravel in mud tanks. Completed cleaning out gravel in mud pits and spread gravel with a backhoe.
9. Cleaned and moved out material. Continued fabricating well marker. Started cutting out drip pans.

#### Summary of the R-EX Plugging Operation

The well was reentered and a bridge plug was set at 7,500 feet in the 3 1/2-inch tubing. The tubing was perforated from 7,465 feet to 7,466 feet and 112 1/2 feet<sup>3</sup> of cement was pumped in the tubing. The tubing was perforated again at 6,250 feet to 6,251 feet and 107 feet<sup>3</sup> of cement was pumped down the tubing. The tubing was again perforated from 3,000 feet to 3,001 feet. The 7 5/8-inch x 5 1/2-inch annulus and the 3 1/2-inch x 5 1/5-inch annulus were cemented. The 3 1/2-inch tubing was plugged to surface. A total of 865 feet<sup>3</sup> of cement was used to plug the well. Equipment was decontaminated and moved out. Contaminated soil was removed and shipped out.

HAYWARD  
#25-95  
EXPLORATORY - RE ENTRY WELL (R-EX)  
"AS BUILT" PLUGGING CONDITION

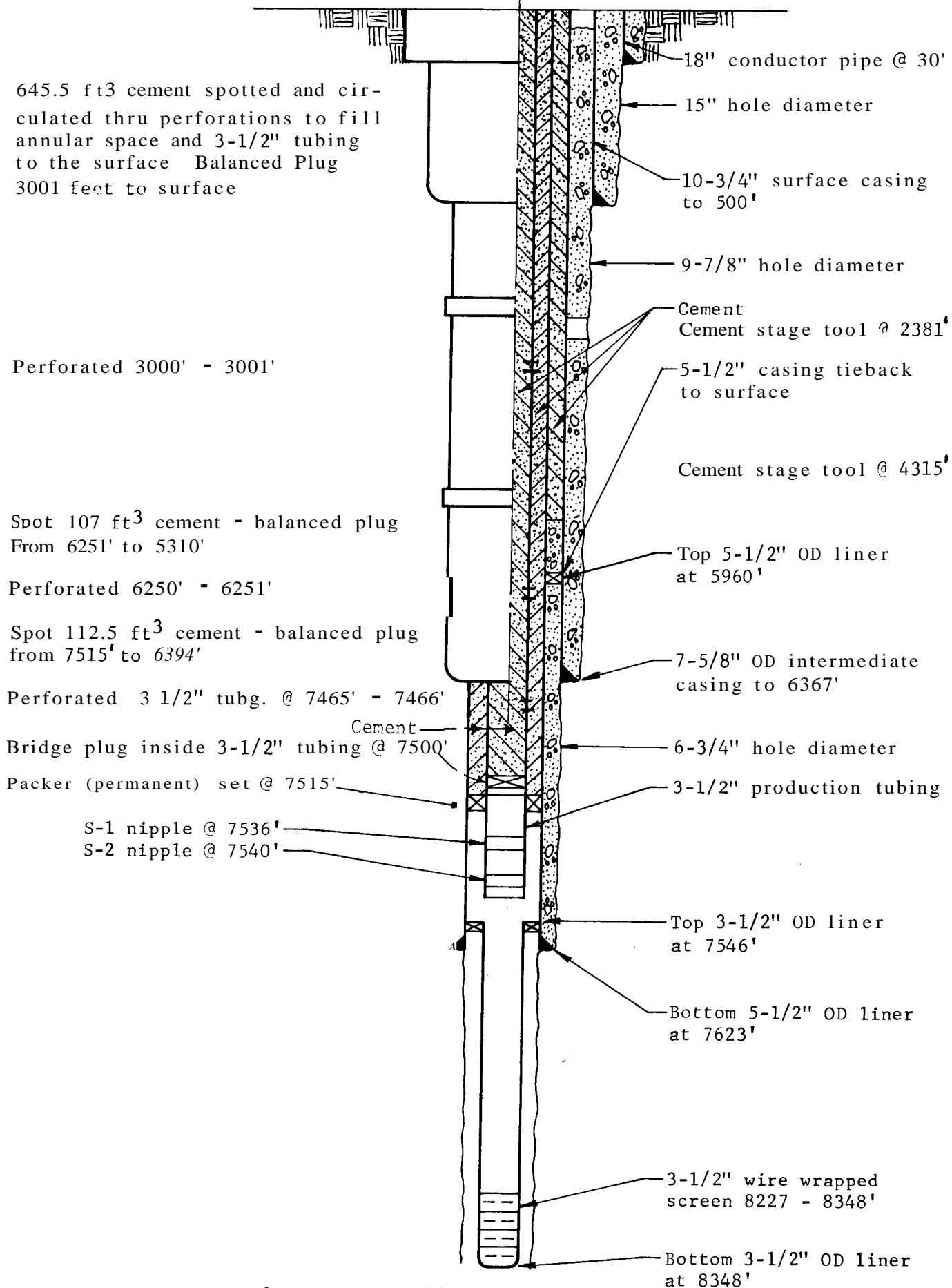


FIGURE 3



B. Plugging and Abandonment Sequence of Emplacement Well R-E

1. Moved in Colorado Well Service, Inc., Franks Explorer Rig #2 and rigged up. Started blowing well down at 1305 hours with 1,680 psi shut-in pressure on the wellhead.
2. Blew well down overnight, 150 psi pressure at 0700 hours. Removed blind flanges from tree and pressure fell to 0 psi. Installed 10-inch Shaffer LWS double gate blowout preventer and stripper head. Rigged up Halliburton pump truck and Eberline monitoring equipment. Ran 2 7/8-inch O.D. tubing in the hole with the bottom joint cut in a taper with full opening. Tagged stemming material in the 10 3/4-inch casing at 227 feet. Attempted to reverse circulate with water and found wellhead leaking, repaired same. Attempted to reverse circulate and found tubing plugged, cleaned out same. Secured rig, worked days only.
3. Shut-in wellhead pressure was 450 psi, bled well down. Washed 2 7/8-inch O.D. tubing down from 227 feet to 262 feet using reverse circulation with water to clean out stemming material. Tubing, swivel, and 2-inch rotary hose would plug and had to be cleaned out.
4. Changed out stand pipe and flow line to 3 inches and rotary hose to 4 inches. Replaced power sub with a power swivel.
5. Shut-in wellhead pressure was 450 psi and bled down. Cleaned out stemming material from 262 feet to 292 feet and plugged rotary hose. Pressure up on rotary hose to 900 psi and hose parted.
6. Shut-in wellhead pressure was 450 psi and bled down. Replaced rotary hose and cleaned out stemming material from 292 feet to 601 feet.
7. Shut-in wellhead pressure was 600 psi and bled down. Cleaned out stemming material from 601 feet to 1,494 feet.

8. Shut-in wellhead pressure was 200 psi and bled down. Cleaned out stemming material from 1,494 feet to 2,340 feet.
9. No wellhead pressure. Cleaned out stemming material from 2,340 feet to 2,953 feet.
10. Cleaned out stemming material from 2,953 feet to 3,604 feet and plugged tubing.
11. Pulled out of hole and found tubing plugged with a brass bar 1 3/4 inches x 6 feet. Ran back in hole and cleaned out stemming material from 3,604 feet to 3,808 feet.
12. Cleaned out stemming material from 3,808 feet to 4,635 feet.
13. No pressure on well. Cleaned out stemming material from 4,635 feet to 5,300 feet.
14. Cleaned out stemming material from 5,300 feet to 5,904 feet and plugged tubing. Dropped stripper rubber in the hole.
15. Pulled out of hole and recovered top stripper rubber. Cleaned out tubing and ran in hole to 5,861 feet and broke circulation. Lowered tubing to 5,893 feet and plugged tubing. Pulled out of hole.
16. Completed pulling out of hole and found a piece of the stripper rubber stuck in the bottom joint. Cleaned out rubber and one joint of stemming material. Ran back in hole and cleaned out stemming material from 5,904 feet to 5,936 feet. Tubing plugged, pulled out of hole. Five joints of tubing plugged with stemming material. Bottom of tubing indicated the 10 3/4-inch casing may be parted between 5,904 feet and 5,936 feet.
17. Ran tubing in the hole to 5,910 feet and broke circulation. Cleaned out to 5,954 feet and bottom collar hung up indicating 10 3/4-inch

casing may be parted at 5,921 feet. Pumped in 67 feet<sup>3</sup> of 50% Pozmix, 50% neat cement, 2% gel, 0.4% HR-4, and 17.4# of salt per sack. Estimated top of cement at 5,821 feet. Displaced slurry with 33.6 barrels of water. Pulled out of hole.

18. Removed blowout equipment, no pressure on wellhead. Rigged up C.A. White wire line services and installed 7/8-inch Kinley cable cutter around the 3/4-inch downhole cable. Lowered cutter and could not get below 3,180 feet. Started out of hole and cutter stopped at 3,120 feet, cable appeared to be stranded. Rigged up GO International and ran 4 3/4-inch jet gun in the hole, tagged cement plug at 5,808 feet. Perforated 10 3/4-inch casing with four holes per foot from 5,801 feet to 5,803 feet, 5,701 feet to 5,703 feet, 5,601 feet to 5,603 feet, 5,501 feet to 5,503 feet, 5,401 feet to 5,403 feet, and 5,301 feet to 5,303 feet. Pulled a strain on the 3/4-inch cable and cut same at 3,190 feet. Pulled tools out of the hole and left 7/8-inch Kinley cable cutter in the hole.
19. Pulled 3/4-inch cable out of the hole and made up on a wire line spool. Cable was stranded on bottom. Installed blowout equipment. Ran Halliburton EZ Drill SV squeeze packer in the hole on 2 7/8-inch tubing, packer took weight at 3,374 feet. Pulled up and set packer at 3,368 feet. Broke down perforations from 5,301 feet to 5,803 feet with 900 psi at 4 1/2 bpm and 1,300 psi at 6 1/2 bpm rate used 30 barrels of water. Pumped 360 barrels of water and drilling fluid (see Section IV.B.) followed by 746 barrels of fresh water through the perforations into the formation. Pumped in 1,575 feet<sup>3</sup> of 50% Pozmix, 50% neat cement, 2% gel, and 0.4% HR-4 through the packer. First 551 feet<sup>3</sup> had 17.4# per sack of salt added to the slurry. Displaced cement with 19 barrels of water at 2,100 to 2,400 psi. Estimated cement out of the perforations was 287 feet<sup>3</sup> leaving 1,288 feet<sup>3</sup> inside the 10 3/4-inch casing. 15 feet<sup>3</sup> was left on top of the packer. Pulled out of packer and flushed tubing with water.

20. Laid down 2 7/8-inch tubing. Ran GO International 4 3/4-inch jet gun in the hole and perforated 10 3/4-inch casing with four holes from 3,000 feet to 3,001 feet and 1,050 feet to 1,051 feet. Ran Halliburton EZ Drill SV squeeze packer in the hole on 2 7/8-inch tubing and set at 2,911 feet. Filled annulus with water and pumped 15 barrels of water down the tubing into the perforation from 3,000 feet to 3,001 feet at 1,400 psi, no returns. Pumped 100 barrels of water in the annulus into the perforations from 1,050 feet to 1,051 feet at 2,500 psi to 1,650 psi, no returns to surface. Pumped 85 barrels of water down the tubing at 1,550 psi to 1,450 psi, no returns to surface. Squeezed perforations from 3,000 feet to 3,001 feet with 411 feet<sup>3</sup> of 50% Pozmix, 50% neat cement, 2% gel, and 0.4% HR-4. Displaced cement with 17 barrels of water. Final squeeze pressure was 1,300 psi. Cement in place at 1630 hours. Estimated 358 feet<sup>3</sup> of cement outside of casing with 53 feet<sup>3</sup> left inside. Pulled tubing.
21. Ran 2 7/8-inch tubing in the hole to 2,910 feet. Plugged back hole in three continuous stages of 323 feet<sup>3</sup> of slurry for a total of 969 feet<sup>3</sup> of 50% Pozmix, 50% neat cement, 2% gel, and 0.4% HR-4. Displaced tubing with three barrels of water. Cement in place at 1003 hours. Top of cement at 1,100 feet. Pulled out 12 stands of tubing and closed pipe rams. Pumped in 25 barrels of water through perforations from 1,050 feet to 1,051 feet at 6 bpm from 1,900 psi to 1,600 psi. Laid down tubing. Removed blowout equipment and installed a 10-inch flange with a 2-inch collar welded to the flange on top of the 10-inch spool. Made up Halliburton cementing line to the 2-inch collar and pumped in 1,690 feet<sup>3</sup> of 50% Pozmix, 50% neat cement, 2% gel, and 0.4% HR-4. When started out the perforations at 1,050 feet to 1,051 feet, the pressure rose to 1,500 psi and dropped to a final pressure of 1,000 psi. Left 581 feet<sup>3</sup> of cement inside the casing with 1,109 feet<sup>3</sup> outside the perforations. Cemented to surface at 1510 hours. Moved rig off of hole. Hole plugged 10/6/76. See Figure 4.

HAYWARD  
#25-95 "A"  
EMPLACEMENT HOLE (R-E)

"AS BUILT" PLUGGING CONDITION

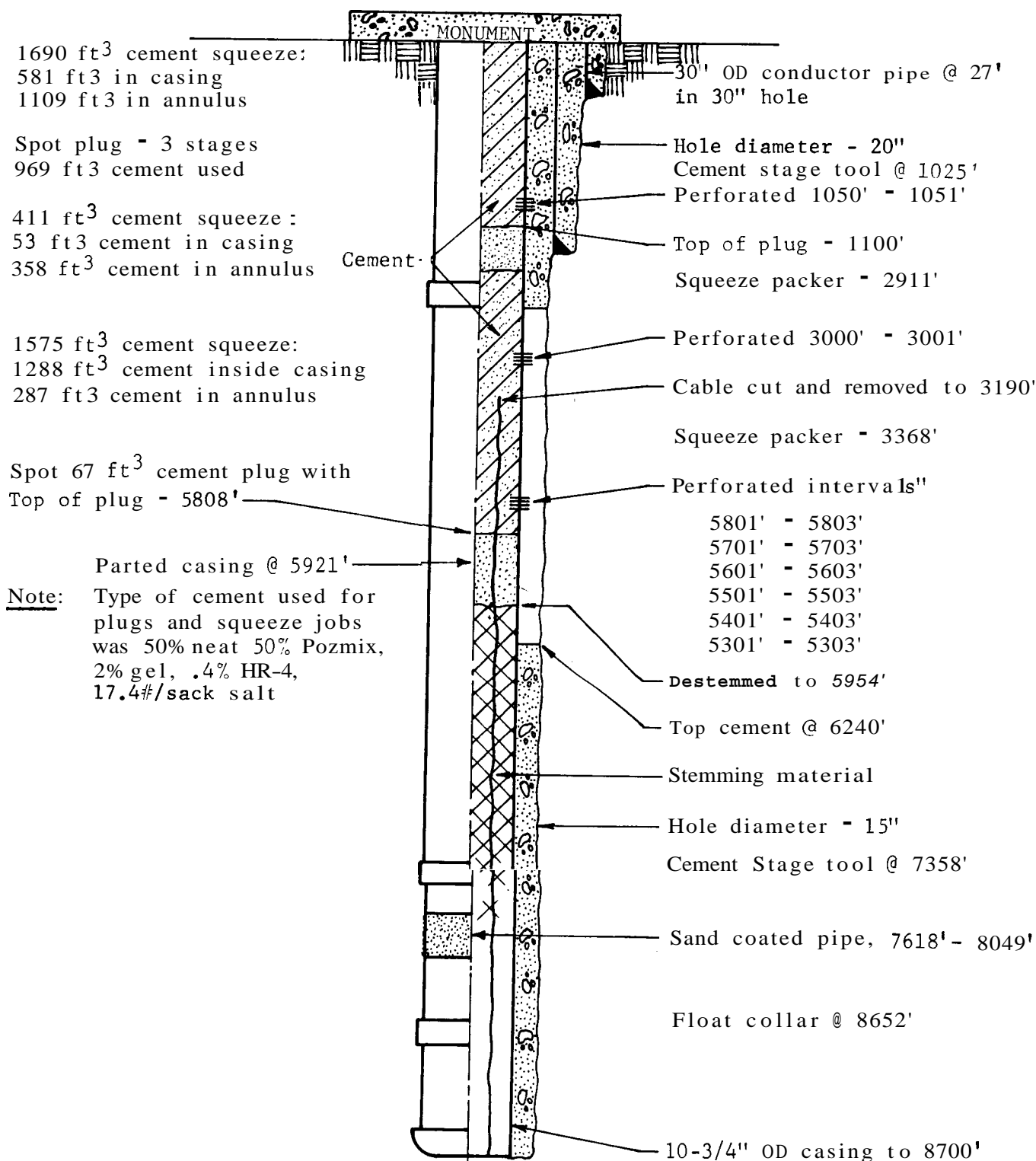


FIGURE 4

### Summary of the R-E Plugging Operation

Pressure was bled off of the well and reentered on 9/14/76. Stemming material was cleaned out inside the 10 3/4-inch casing from 227 feet to 5,954 feet using a Halliburton pump truck and reverse circulation with water. This material was circulated into a steel mud pit. Obstructions encountered while running the 2 7/8-inch destemming tubing indicated the 10 3/4-inch casing could be parted at 5,921 feet. A 67 cubic foot cement plug was set inside the casing with the top at 5,808 feet. The casing was perforated from 5,801 feet to 5,803 feet, 5,701 feet to 5,703 feet, 5,601 feet to 5,603 feet, 5,501 feet to 5,503 feet, 5,401 feet to 5,403 feet, and 5,301 feet to 5,303 feet. A 3/4-inch downhole cable was cut at 3,190 feet and removed. A squeeze packer was set at 3,368 feet and the perforations squeezed with 1,575 cubic feet of cement slurry leaving 1,288 cubic feet inside the 10 3/4-inch casing. The casing was again perforated from 3,000 feet to 3,001 feet and 1,050 feet to 1,051 feet. A squeeze packer was set at 2,911 feet and the perforations at 3,000 feet to 3,001 feet were squeezed with 411 cubic feet of cement slurry leaving 53 cubic feet inside the casing. A cement plug was set from the packer to 1,100 feet with 969 cubic feet of slurry. The perforations from 1,050 feet to 1,051 feet were then squeezed from surface with 1,690 cubic feet of cement slurry leaving 581 cubic feet inside the 10 3/4-inch casing. Plugged to surface 10/6/76. See Figure 4. The USGS Sundry Notice approving the plugging of the R-E well is attached as Appendix C and the Fenix & Scisson Daily Reports/Time Logs are attached as Appendix D.

#### C. Surface Facilities

All surface facilities were dismantled, inspected, surveyed for radiation, decontaminated if necessary, and prepared for shipment in a manner consistent with Department of Transportation (DOT) procedures relating to the shipping of low-level radiologically contaminated materials.

1. The three 210-barrel holding tanks were satisfactorily decontaminated. They were then loaded onto flatbed trucks and shipped to an Austral Oil Company storage facility.
2. The separator and flow lines were satisfactorily decontaminated and shipped to an Austral Oil Company storage facility.
3. The fence surrounding the emplacement well, R-E, was taken down, rolled up, and given to the Rulison site landowner. All other fencing around the perimeter of the site was left in place at the request of the landowner.
4. All surface piping was decoupled, cut into manageable lengths, checked for contamination, and decontaminated satisfactorily. It was then shipped to an Austral storage facility.
5. The two temporary buildings on site were used for storage until the latest possible time. They were then dismantled, checked for contamination (none was found), and shipped to an Austral storage facility.
6. All access roads were left intact and in good condition for the landowner's use at his request.
7. All wellhead equipment was removed from the wells, successfully decontaminated, and shipped to an Austral storage facility.
8. Material from the destemming operation was found to be uncontaminated and was spread around the pad as per instructions of site owner.

D. Package and Transportation

All materials, particularly radiologically contaminated materials, were packaged, prepared for shipping, and shipped in a manner that assured protection of the public health and safety during transport.

All packaging, labeling, marking, and transportation were in accordance with the DOT requirements.

Commercial freight carriers were used to transport all materials off site. The freight carrier that transported the low-level contaminated material in steel drums was an experienced carrier of contaminated materials and was duly licensed to provide such service. All low-level contaminated materials were shipped to the Nuclear Engineering Corp. (NEC) burial grounds near Beatty, Nevada. The 3,190 feet of 3/4-inch steel armored cable removed from the emplacement well was checked for radiation, found uncontaminated, and shipped to an Austral storage facility.

No extraordinary precautions had to be taken for shipping equipment because all items were successfully decontaminated. All proper forms were completed for shipment of low-level contaminants to NEC at Beatty, Nevada.

E. Burial and Disposal of Contaminated Materials and Fluids

The types, quantities, and destination of all contaminated material are covered in the Rulison Radiation Contamination Clearance Report, PNE-R-68, June 1977, by the Eberline Instrument Corporation.

F. Well Location and Marking

Well R-EX was appropriately marked by a 4-foot length of 3-inch pipe cemented into the ground as a monument as prescribed by the Colorado Oil and Gas Conservation Commission rules and regulations. Well R-E was further marked by a low concrete monument with a brass plaque imbedded in it, denoting the site's historic significance and stating the restrictions imposed against subsurface drilling and removal of subsurface material within a prescribed depth.

The inscription on the plaque reads:



Project Rulison  
Nuclear Explosive Emplacement Well (R-E)

Site of the second nuclear gas stimulation experiment in the United States. One 43 kiloton nuclear explosive was detonated in this well 8,426 feet below the surface on September 10, 1969.

No excavation, drilling, and/or removal of subsurface materials below a depth of 6,000 feet is permitted within Lot 11, NE 1/4 SW 1/4, of Section 25, Township 7 South, Range 95 West, 6th Principal Meridian, Garfield County, Colorado, without U.S. Government permission.

U.S. Energy Research and Development Administration  
August 1976

#### IV. RADIOLOGICAL SAFETY PROGRAM

##### A. Purpose

The purpose of the Radiological Safety Program was to establish general guidelines, methods, and standards to ensure that cleanup operations are conducted in a manner that (1) precludes radiation exposure to participating personnel or to the public, and (2) does not add significant radiological contamination to the Rulison site or adjacent surface. These criteria have been met and are documented in the Rulison Radiation Contamination Clearance Report--PNE-R-68, June 1977.

##### B. Radiological Conditions

All equipment was decontaminated and inspected by Eberline Instrument Corporation, the on-site Radiological Safety contractor. All radiological samples from equipment and the ground (soil) were analyzed and found to be below radiological guidelines before the site was abandoned. **Also,** all of the low-level tritium-contaminated fluids left over from the decontamination operation were either steamed off or placed in barrels and shipped to NEC, Beatty, Nevada, for storage.

No burial of radioactive solids was made on the Rulison site. Radioactive nuclide particulates resulting from the detonation are contained in the detonation-formed cavity. There were also 360 barrels of water and drilling fluid containing 0 to 166 curies of tritium, pumped into the formation in the interval between 5,300 and 5,800 feet for disposal. The potable aquifers above this depth, however, were previously cemented off in the casing-formation annulus during emplacement drilling, and the inside of the casing was continuously cemented from 5,808 feet to the surface.

## V. GENERALIZED SITE ACTIVITIES

### A. Communications

The existing telephone system at the Rulison site was maintained by Austral. The users billed their toll call charges to their respective organizations.

### B. Vehicles

Project participants provided and maintained their own vehicles.

### C. General Operational and Logistical Support

Austral provided the following general logistical and operational support. Some of the items furnished were:

1. Workover Rig (pulling unit)
2. Potable Drinking Water
3. Electrical Power
4. Fire Protection
5. Sanitary Facilities
6. Access Road Maintenance
7. Pumps and Pressure Systems for Decontamination of Fresh Water Supply
8. Steam Cleaner
9. Miscellaneous Items

D. Occupational Health and Safety

1. General

All operations and activities were conducted in accordance with the standards of the Occupational Safety and Health Act of 1970 (OSHA).

All participating organizations were responsible for the health and safety of their own personnel and for conducting their activities in accordance with procedures that assured:

- a. A safe and healthful environment for the employees.
- b. Control and minimization of hazards to the public and to personnel of other participants.
- c. Minimization of the accidental damage or loss of equipment, materials, and property.

2. First Aid

ERDA provided each participating agency contacts with local medical facilities and physicians in the Grand Junction, Rifle, and Meeker areas for use in the event of occupational accident or occupational illness. However, each individual or organization was responsible for their own medical bills. Emergency transportation of injured persons of all agencies to a medical facility was provided by Austral (however, no injuries were incurred). ERDA arranged for and provided first-aid supplies as approved by a physician. These supplies were controlled and maintained by Eberline.

3. Fire Protection

Austral provided hand-operated fire extinguishers at the well locations at points convenient to each significant structure or piece of

equipment. Extinguisher types were varied and sized for control of Class A, B, or C fires, as appropriate.

4. Sanitation

Austral provided potable water for drinking. ~~One~~ chemical toilet was also provided and serviced as required. Solid wastes were disposed of in accordance with local regulations.

## VI. ENVIRONMENTAL IMPACT ASSESSMENT

An environmental assessment was prepared in accordance with the requirements of Title 10, Part 11, of the Code of Federal Regulations, dated February 16, 1974, which prescribes the procedures to be followed for ERDA implementation of the National Environmental Policy Act of 1969. The purpose of this assessment was to present a brief description of activities proposed for the Rulison site abandonment and an evaluation as to whether or not an Environmental Statement should have been prepared.

It was determined by the assessment that the requested action did not constitute a major federal action significantly affecting the environment in the sense of the National Environmental Policy Act of 1969, Section 102(2)(c). The assessment was accurate. No adverse effects to the environment occurred.

This assessment is available from the Nevada Operations Office of the U.S. Energy Research and Development Administration, Las Vegas, Nevada 89114.

## VII. PUBLIC INFORMATION AND OPEN FILES

### A. General

The following information was made available to the public prior to and during the Project Rulison site abandonment operation:

#### 1. News Announcement

- a. A comprehensive public announcement was scheduled and made in advance of Austral seeking approval from state and federal agencies on the well plugging and site abandonment plan. The announcement included start-up date and estimated completion date. **No** other announcements were made.
- b. **No** accidents **or** incidents of consequence occurred that had to be reported publicly to the **NV** Office of Public Affairs.

#### 2. Briefings and Meetings

- a. State officials were informed prior to the first public announcement with a cover letter including the public announcement.
- b. No public meetings were requested or held. Only one on-site briefing by the Colorado Department of Health was requested and subsequently provided.

#### 3. Open Files

Upon completion of the site abandonment reports, all final documents will be placed in the Rulison open files.

## VIII. CLASSIFICATION AND SECURITY

Basic classification guidance for Project Rulison-related activities is contained in the Classification Guide for the Peaceful Application of Nuclear Explosives (CG-PNE-2, dated March 1973), as supplemented by the Project Rulison Classification Guide (dated April 11, 1969).

The only classified interest remaining at the Rulison site is the nonvolatile radioactive debris in the chimney. This debris is classified Secret, Restricted Data, until analyzed. It is protected by approximately 8,000 feet of overburden.

No radioactive particulate material was encountered during plugging operations.



## IX. PROGRAM MANAGEMENT

### A. U.S. Energy Research and Development Administration/Nevada Operations Office (ERDA/NV)

#### 1. General

The ERDA, through the Manager, NV, appointed an ERDA Project Director responsible for all project-related activities. The ERDA Project Director further established and staffed the necessary elements to satisfy those responsibilities.

The areas of authority and responsibility of the ERDA Project Director were as follows:

- a. Administered Contracts E(26-1)-429 and E(26-1)-667 with Austral Oil Company, Inc., for well plugging and abandonment activities, decontamination, and radiological safety programs, and provided general logistical support.
- b. Provided a drilling engineer from Fenix & Scisson, Inc. (F&S), to assist Austral in the plugging and abandonment operations.
- c. Reviewed and certified the provisions for safety of on- and off-site personnel. Radiological operations were directed by an ERDA Radiological Operations Supervisor (ROS) who also provided and interpreted radiological control and documentation criteria to the Project Director.
- d. Approved all major changes to plugging and abandonment operations.
- e. Coordinated the on-site activities of Austral, Eberline Instrument Corporation, F&S, and ERDA.

## 2. Field Operations

The ERDA Project Director was represented on site by individuals with the following areas of responsibility and authority:

- a. An ERDA Project Engineer was responsible for the general day-to-day coordination of the Austral well plugging and abandonment, surface cleanup, and logistical support effort and coordinated all radiological-related support (i.e., decontamination, monitoring, and sampling) with the Radiological Operations Supervisor. Additional responsibilities included, but were not limited to, keeping the Project Director advised of the daily status of the work.

The Project Engineer had authority to make ERDA program execution decisions as required to expedite project accomplishment.

- b. An ERDA Radiological Operations Supervisor (ROS) had the responsibility for the technical direction of the Eberline radiological support effort to assure that the support efforts were in accordance with the program requirements. He kept himself continuously informed of radiological conditions, kept the Project Engineer advised of the status of the radiological operations, and assisted the Project Engineer in the coordination and interface of the Eberline radiological support for the several categories of site abandonment activities.

The ROS maintained a daily log of significant events and provided other guidance as required on the reports and other areas of the radiological operations.

### B. Austral Oil Company, Inc.

Austral, in accordance with its ERDA Austral contract, appointed a Project Manager to provide on-site project supervision. Austral was responsible

for coordination of the abandonment plan with the Water Quality Control Division and the Oil and Gas Commission of the State of Colorado and appropriate federal agencies such as the U.S. Geological Survey. Austral was responsible for the direction of all well plugging and site abandonment activities, including procurement of all materials and services (including radiological safety services) required for the field operation. Austral was also responsible for providing advice to the Eberline Instrument Corporation and ERDA regarding the best plug and abandonment procedures and the most economic means to accomplish the operation.

The Austral Project Manager kept the ERDA field representative advised of the daily activities and had the authority to suspend site activities and initiate emergency procedures if, in his judgment, any operation in progress jeopardized the safety of personnel in connection with the conduct of the program.

C. Eberline Instrument Corporation

Eberline, under contract to Austral, provided an On-Site Supervisor to direct the radiological safety monitoring, decontamination activities, and sampling program during operations. This Supervisor was responsible for the direction of his staff and coordination of daily activities with ERDA and Austral.

D. Fenix and Scisson, Inc. (F&S)

F&S provided a drilling engineer to assist Austral with the well plugging and abandonment operations.

F&S prepared the as-built drawings on the R-E and R-EX well plug and abandonment operation which are included in this report as Figures 3 and 4.

## X. TECHNICAL REPORTING

Certain reports were required during and after the field operations. These reports documented the progress of the program while under way and the results when completed. The reports required and the responsible organization follow:

### A. Austral Reporting of Well Plugging and Site Abandonment

1. Austral provided the ERDA Project Engineer with a brief, daily report of field operations. This report contained all information pertinent to the field operation for each 24-hour period (8 a.m. to 8 a.m.), including any significant problem areas delaying the operation.
2. Austral provided for all reporting required by the State of Colorado and the U.S. Department of the Interior, U.S. Geological Survey, etc., and coordinated its radiological operations with the ERDA ROS.
3. Austral provided technical data on all well plugging and abandonment work in sufficient detail to permit F&S to prepare the as-built reports included in this Final Site Abandonment Report (see Figures 3 and 4).

### B. Eberline Reporting of Radiological Operations

1. Eberline provided the ERDA ROS a brief narrative daily report of field operations. This report contained information on the radiological progress for each 24-hour period (8 a.m. to 8 a.m.), including any significant problem areas delaying the operation.
2. Eberline also provided Environmental Monitoring Summary Reports to fulfill the requirements of ERDA Manual Chapter 0513 and the Contamination Clearance Report, as required by ERDA Manual Chapter 5301.

C. ERDA Final Site Abandonment Report

This report documents the site status at the conclusion of abandonment procedures and the final disposition of all project facilities, equipment, and material as well as recording the as-built status of all wells at the completion of plugging.

## XI. LONG-TERM RADIOLOGICAL SURVEILLANCE PROGRAM

### A. Hydrology

A Hydrologic Program Advisory Group (HPAG) reviewed the hydrologic monitoring program proposed for the Rulison site at a meeting in December of 1971. They found the program adequate and recommended its immediate initiation. The U.S. Environmental Protection Agency (EPA/NERC), Las Vegas, Nevada, has been conducting the monitoring program for ERDA since that time.

#### 1. Sampling Points

The sampling points, as shown in Figure 5, are listed below:

- a. Battlement Creek at the nearest down gradient accessible location in T7S, R95W, Sec. 15 SE 1/4 NE 1/4.
- b. Two private wells in alluvium on Morrisania Mesa.

Locations:

- (1) T7S, R95W, Sec. 10 NE 1/4 SE 1/4 NW 1/4 (Lee Hayward Ranch).
  - (2) T7S, R95W, Sec. 3 SW 1/4 SE 1/4 SE 1/4 (Glen Schwab Ranch).
- c. Water supply springs for Grand Valley located at T7S, R95W, Sec. 5 SE 1/4 SW 1/4 SE 1/4.
  - d. Two springs and two wells located close to surface ground zero:
    - (1) Well: T7S, R95W, Sec. 20 NE 1/4 NW 1/4 NW 1/4 (Albert Gardner Ranch).

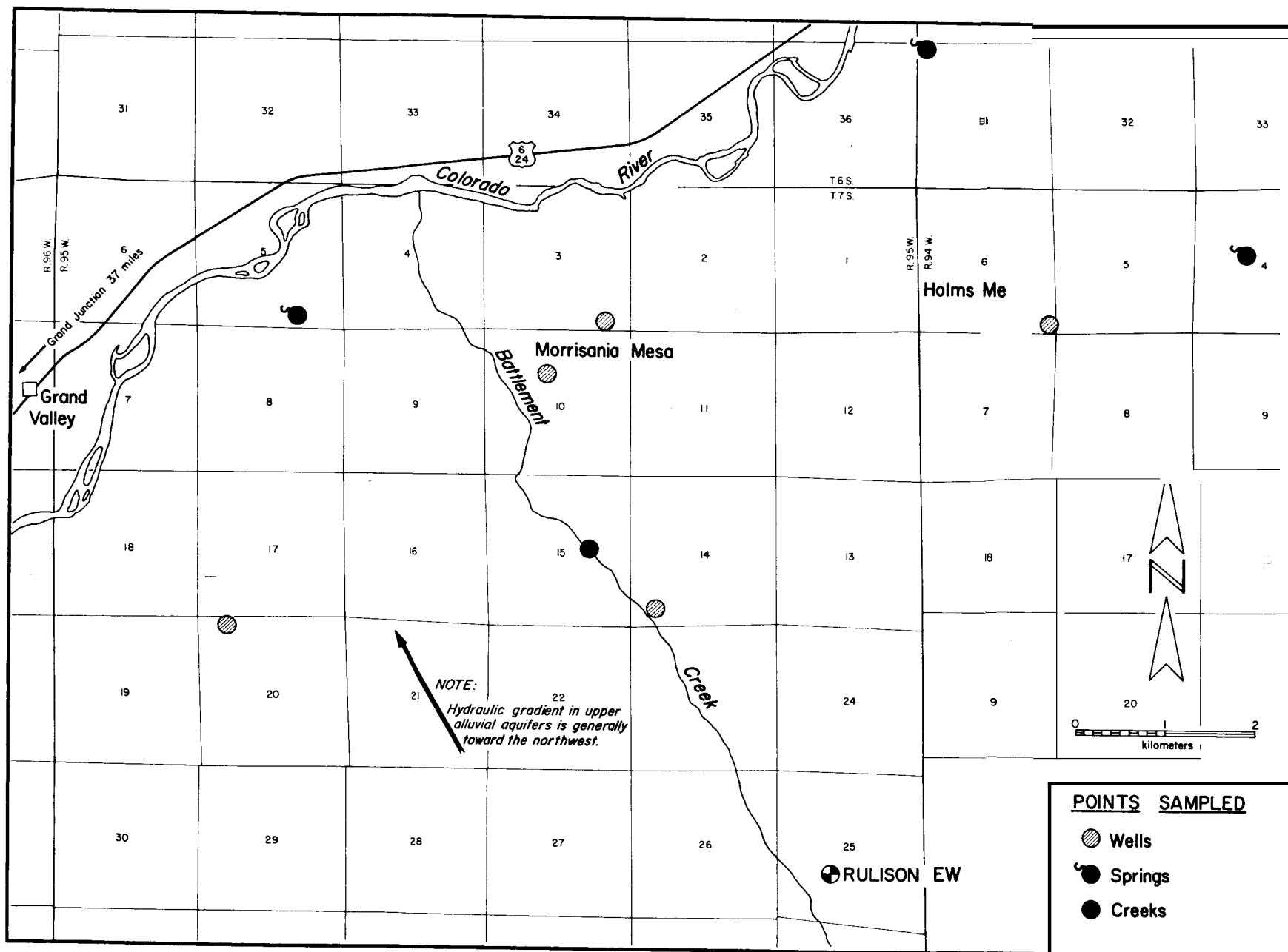


FIGURE 5. HYDROLOGIC SAMPLING POINTS - RULISON EVENT

(2) Well: T7S, R95W, Sec. 6 NE 1/4 SE 1/4 SE 1/4 (Felix Sefcovic Ranch).

(3) Spring: T7S, R94W, Sec. 4 SW 1/4 SE 1/4 NW 1/4 (Bernklau Ranch).

(4) Spring: T6S, R94W, Sec. 31 NW 1/4 NW 1/4 NW 1/4 (Potter Ranch).

e. The Austral well located at T7S, R95W, Sec. 14 SW 1/4 SW 1/4.

## 2. Sample Analysis

Unless otherwise specified, all samples are analyzed for tritium using a technique with a detection sensitivity of 150 tritium units." All samples are analyzed for gross alpha and gross beta radioactivity and are given a gamma spectral scan. Gross chemistry analyses, comparable to the USGS chemical water quality analyses, were performed on all samples collected on the initial sample run. Based on the results of these analyses, suspect samples will be analyzed for appropriate naturally occurring and man-made isotopes. Splits of each sample collected will be retained by EPA/NERC for this purpose until it is demonstrated that the need to retain them does not exist.

## 3. Frequency

Each water source is sampled once a year, preferably in the early spring, weather permitting.

---

\*One tritium unit equals 3.3 pCi/l.



4. Reports

Annual reports will be prepared and distributed by the EPA.

5. Duration

To carry out its radiological safety responsibility, the Government (ERDA) will continue its hydrologic monitoring program indefinitely.

B. Bioenvironment

No need for monitoring the bioenvironment of this site on an annual basis has been demonstrated. Therefore, until such time as the monitoring of surface or groundwater indicates a reason for collecting and analyzing samples of the plant and/or animal species of the area, no collection will be made.

C. Land Surface and Soils

No requirements for radiation monitoring instrument surveys or analysis of soil samples on an annual basis has been demonstrated. Therefore, only in the event that monitoring of surface and groundwater indicates a need for additional surveillance will any be performed.

# APPENDIX A

Form 9-311  
(May 1963)

## UNITED STATES DEPARTMENT OF THE INTERIOR GEOLOGICAL SURVEY

SUBMIT IN TRIPPLICATE\*  
(Other instructions on re-  
verse side)

Form approved.  
Budget Bureau No. 42-R1424.

### SUNDRY NOTICES AND REPORTS ON WELLS

(Do not use this form for proposals to drill or to deepen or plug back to a different reservoir.  
Use "APPLICATION FOR PERMIT—" for such proposals.)

1. OIL WELL <input type="checkbox"/> GAS WELL <input checked="" type="checkbox"/> OTHER <input type="checkbox"/>		5. LEASE DESIGNATION AND SERIAL NO. 06985 PAT.	
2. NAME OF OPERATOR AUSTRAL OIL COMPANY INCORPORATED		6. IF INDIAN, ALLOTTEE OR TRIBE NAME	
3. ADDRESS OF OPERATOR 2700 Exxon Building, Houston, Texas. 77002		7. UNIT AGREEMENT NAME Rulison	
4. LOCATION OF WELL (Report location clearly and in accordance with any State requirements. See also space 17 below.) At surface 2235.93' E of W line and 1694.81 N of S line of Sec. 25.		8. FARM OR LEASE NAME Hayward	
14. PERMIT NO. 67-393		9. WELL NO. #25-95 (R-EX)	
15. ELEVATIONS (Show whether DF, RT, GR, etc.) 8199.16 GR and 8200.16 CH		10. FIELD AND POOL, OR WILDCAT Rulison	
16. Check Appropriate Box To Indicate Nature of Notice, Report, or Other Data		11. SEC., T., R., M., OR BLM. AND SURVEY OR AREA Sec. 25, T7S, R95W, 6th	
17. DESCRIBE PROPOSED OR COMPLETED OPERATIONS (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work. If well is directionally drilled, give subsurface locations and measured and true vertical depths for all markers and zones pertinent to this work.)		12. COUNTY OR PARISH Garfield	
		13. STATE Colorado	

#### NOTICE OF INTENTION TO:

TEST WATER SHUT-OFF <input type="checkbox"/>	PULL OR ALTER CASING <input type="checkbox"/>
FRACTURE TREAT <input type="checkbox"/>	MULTIPLE COMPLETE <input type="checkbox"/>
SHOOT OR ACIDIZE <input type="checkbox"/>	ABANDON* <input type="checkbox"/>
REPAIR WELL <input type="checkbox"/>	CHANGE PLANS <input type="checkbox"/>
(Other) <input type="checkbox"/>	

#### SUBSEQUENT REPORT OF:

WATER SHUT-OFF <input type="checkbox"/>	REPAIRING WELL <input type="checkbox"/>
FRACTURE TREATMENT <input type="checkbox"/>	ALTERING CASING <input type="checkbox"/>
SHOOTING OR ACIDIZING <input type="checkbox"/>	ABANDONMENT* <input checked="" type="checkbox"/>
(Other) <input type="checkbox"/>	

(NOTE: Report results of multiple completion on Well Completion or Recompletion Report and Log form.)

17. DESCRIBE PROPOSED OR COMPLETED OPERATIONS (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work. If well is directionally drilled, give subsurface locations and measured and true vertical depths for all markers and zones pertinent to this work.)

- Removed xmas tree to top of lower master valve. Obtained gas samples for radiochemical analysis.
- Set Otis ST-2 plug choke in 3-1/2" tubing at 7526'. Set bridge plug in 3-1/2" tubing 7500'. Loaded hole with water and tested bridge plug to 1,000 psi. Perforated 4 holes in 3-1/2" tubing at 7565'-7566'. Circulated out 140 bbls. mud. Circulated 81 sks. cement plug from 7466' back to 6450'.
- Ran perforating gun, found cement at 6394'. Perforated 4 holes in 3-1/2" tubing at 6250'-6251'. Circulated 77 sks. cement plug from 6251' back to 5310'. Perforated 3-1/2" tubing and 5-1/2" casing at 3000'. Established circulation in 7-5/8" x 5-1/2" annulus and cemented annulus. Pumped down 3-1/2" tubing back out 5-1/2" casing and cemented same from 3000' back to surface.
- Removed wellhead. Cemented top of casing strings. Welded plate on top. Erected marker.

18. I hereby certify that the foregoing is true and correct

SIGNED Myles Reynolds Jr. TITLE Vice President

DATE January 25, 1977

(This space for Federal or State Office use)

APPROVED BY [Signature] TITLE DISTRICT MANAGER

DATE 1/27/77

APPROVED [Signature] & Subsurface Program - Does not include rehabilitation of surface - Pot lands & minerals - State Function.

\*See Instructions on Reverse Side

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
GEOLOGICAL SURVEY

SUBMIT IN TRIPPLICATE\*  
(Other instructions on re-  
verse side)

Form approved.  
Budget Bureau No. 42-R1424.

5. LEASE DESIGNATION AND SERIAL NO.

FED 14-08-001-8884

6. IF INDIAN, ALLOTTEE OR TRIBE NAME

SUNDRY NOTICES AND REPORTS ON WELLS

(Do not use this form for proposals to drill or to deepen or plug back to a different reservoir.  
Use "APPLICATION FOR PERMIT—" for such proposals.)

1. OIL WELL ☐ GAS WELL ☒ OTHER Nuclear Emplacement Well

2. NAME OF OPERATOR  
AUSTRAL OIL COMPANY INCORPORATED

3. ADDRESS OF OPERATOR  
2700 Exxon Building, Houston, Texas 77002

4. LOCATION OF WELL (Report location clearly and in accordance with any State requirements.\*  
See also space 17 below.)  
At surface 1976.31' E of W line and 1813.19' N of S line  
of Sec. 25, T7S, R95W, of 6th P.M.

7. UNIT AGREEMENT NAME

Rulison

8. FARM OR LEASE NAME

Hayward "A"

9. WELL NO.

25-95 (R-E)

10. FIELD, AND, POOL, OR WILDCAT

11. SEC., T., R., N., OR E., AND  
SURVEY OR AREA

Sec. 25, T7S, R95W, 6th

14. PERMIT NO.

15. ELEVATIONS (Show whether DF, RT, CR, etc.)

12. COUNTY OR PARISH 13. STATE

TEST RATEL SHUT-OFF

FRACTURE TREAT

SHOOT OR ACIDIZE

REPAIR WELL

(Other)

PGILL OR ALTER CASING

MULTIPLE COMPLETE

ABANDON\*

CHANGE PLANS

WATER SHUT-OFF

FRACTURE TREATMENT

SHOOTING OR ACIDIZING

(Other)

(NOTE: Report results of multiple completion on Well

REPAIRING WELL

ALTERING CASING

ABANDONMENT

Pump in 200 bbls. of waste water and 100 bbls. waste mud  
fresh water and 1575 cu. ft. of 50/50 Poz cement with 2% gel

-5. Unilateral decision by ERDA (Ltr 2/17/77-4568)  
A hole in 10-3/4" casing in following intervals: 3000-3001' and 1050-1051'

7. Welded plate on top. Poured concrete for monument and set bronze plaque.

18. I hereby certify that the foregoing is true and correct

SIGNED Miles Reynolds

TITLE Vice President

DATE January 25, 1977

(This space for Federal or State office use)

APPROVED BY [Signature]

TITLE

DATE

CONDITIONS OF APPROVAL, IF ANY:

APPROVED FOR USE IN PURPOSES of Sub-surface program - Does not  
include surface rehabilitation - Pot Lands & Minerals - State Function

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
GEOLOGICAL SURVEYSUBMIT IN TRIPLICATE\*  
(Other Instructions on re-  
verse side)Form approved.  
Budget Bureau No. 42-R1424.

5. LEASE DESIGNATION AND SERIAL NO.

06935

6. IF INDIAN, ALLOTTEE OR TRIBE NAME

## SUNDRY NOTICES AND REPORTS ON WELLS

(Do not use this form for proposals to drill or to deepen or plug back to a different reservoir.  
Use "APPLICATION FOR PERMIT—" for such proposals.)

RECEIVED

JAN 28 1977

7. UNIT AGREEMENT NAME

Rulison

8. FARM OR LEASE NAME

Hayward

9. WELL NO.

#25-95 (R-EX)

10. FIELD AND, POOL, OR WILDCAT

Rulison

11. SEC., T., E., M., OR BLK. AND  
SUEVEY OR AREA

Sec. 25, T7S, R95W, 6th

12. COUNTY OR PARISH

Garfield

13. STATE

Colorado

1. OIL ☐ GAS ☒ OTHER

2. NAME OF OPERATOR

AUSTRAL OIL COMPANY INCORPORATED

3. ADDRESS OF OPERATOR

2700 Exxon Building, Houston, Texas 77002

4. LOCATION OF WELL (Report location clearly and in accordance with any State requirements.\*  
See also space 17 below.)

At surface

2235.93' E of W line and 1694.81 N of S line  
of Sec. 25.

14. PERMIT NO.

67-393

15. ELEVATIONS (Show whether DF, RT, CP, etc.)

8199.16 GR and 8200.16 CH

16. Check Appropriate Box To Indicate Nature of Notice, Report, or Other Data

NOTICE OF INTENTION TO:

TEST WATER SHUT-OFF

☐  
☐  
☐  
☐

PULL OR ALTER CASING

☐  
☐  
☐  
☐

FRACTURE TREAT

MULTIPLE COMPLETION

SHOOT OR ACIDIZE

ABANDON\*

REPAIR WELL

CHANGE PLANS

(Other)

SUBSEQUENT REPORT OF:

WATER SHUT-OFF

☐  
☐  
☐  
☐

FRACTURE TREATMENT

SHOOTING OR ACIDIZING

(Other)

REPAIRING WELL

ALTERING CASING

ABANDONMENT\*

☐  
☐  
☒  
☐(NOTE: Report results of multiple completion on Well  
Completion or Recompletion Report and Log form.)17. DESCRIBE PROPOSED OR COMPLETED OPERATIONS (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any  
proposed work. If well is directionally drilled, give subsurface locations and measured and true vertical depths for all markers and zones perti-  
nent to this work.)

1. Removed xmas tree to top of lower master valve. Obtained gas samples for radiochemi
2. Set Otis ST-2 plug choke in 3-1/2" tubing at 7526'. Set bridge plug in 3-1/2" tubing 7500'. Loaded hole with water and tested bridge plug to 1,000 psi. Perforated 4 hole in 3-1/2" tubing at 7565'-7566'. Circulated out 140 bbls. mud. Circulated 81 sks. cement plug from 7466' back to 6450'.
3. Ran perforating gun, found cement at 6394'. Perforated 4 holes in 3-1/2" tubing at 6250'-6251'. Circulated 77 sks. cement plug from 6251' back to 5310'. Perforated 3-1/2" tubing and 5-1/2" casing at 3000'. Established circulation in 7-5/8" x 5-1/2" annulus and cemented annulus. Pumped down 3-1/2" tubing back out 5-1/2" casing and cemented same from 3000' back to surface.
4. Removed wellhead. Cemented top of casing strings. Welded plate on top. Erected marker.

18. I hereby certify that the foregoing is true and correct

SIGNED

*Miles Reynolds Jr.*

TITLE

Vice President

DATE

January 25, 1977

(This space for Federal or State office use)

APPROVED BY

*W. C. Rogers*

TITLE

DIRECTOR

DATE

FEB 2 1977

CONDITIONS OF APPROVAL, IF ANY:

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
GEOLOGICAL SURVEY

SUBMIT IN TRIPPLICATE\*  
(Other instructions on re-  
verse side)

Form approved.  
Budget Bureau No. 42-R1424.

5. LEASE DESIGNATION AND SERIAL NO.

FED 14-08-001-8884

6. IF INDIAN, ALLOTTEE OR TRIBE NAME

SUNDRY NOTICES AND REPORTS ON WELLS

(Do not use this form for proposals to drill or to deepen or plug back to a different reservoir.  
Use "APPLICATION FOR PERMIT—" for such proposals.)

1. OIL WELL <input type="checkbox"/> GAS WELL <input checked="" type="checkbox"/> OTHER Nuclear Emplacement Well	7. UNIT AGREEMENT NAME Rulison
2. NAME OF OPERATOR AUSTRAL OIL COMPANY INCORPORATED	8. FARM OR LEASE NAME Hayward "A"
3. ADDRESS OF OPERATOR 2700 Exxon Building, Houston, Texas 77002	9. WELL NO. 25-95 (R-E)
4. LOCATION OF WELL (Report location clearly and in accordance with any State requirements. See also space 17 below.) At surface 1976.31' E of W line and 1813.19' N of S line of Sec. 25, T7S, R95W, of 6th P.M.	10. FIELD, AND, POOL, OR WILDCAT
14. PERMIT NO. 68-328	15. ELEVATIONS (Show whether DF, RT, GR, etc.) 8,153.93' GR
11. SEC., T., R., M., OR BLK. AND SECTION OF AREA Sec. 25, T7S, R95W, 6th	12. COUNTY OR PARISH Garfield
	13. STATE Colorado

16. Check Appropriate Box To Indicate Nature of Notice, Report, or Other Data

NOTICE OF INTENTION TO:		SUBSEQUENT REPORT OF:	
TEST WATER SHUT-OFF <input type="checkbox"/>	PULL OR ALTER CASING <input type="checkbox"/>	WATER SHUT-OFF <input type="checkbox"/>	REPAIRING WELL <input type="checkbox"/>
FRACTURE TREAT <input type="checkbox"/>	MULTIPLE COMPLETE <input type="checkbox"/>	FRACTURE TREATMENT <input type="checkbox"/>	ALTERING CASING <input type="checkbox"/>
SHOOT OR ACIDIZE <input type="checkbox"/>	ABANDON* <input type="checkbox"/>	SHOOTING OR ACIDIZING <input type="checkbox"/>	ABANDONMENT* <input checked="" type="checkbox"/>
REPAIR WELL <input type="checkbox"/>	CHANGE PLANS <input type="checkbox"/>	(Other) <input type="checkbox"/>	

(NOTE: Report results of multiple completion on Well Completion or Recompletion Report and Log form.)

17. DESCRIBE PROPOSED OR COMPLETED OPERATIONS (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work. If well is directionally drilled, give subsurface locations and measured and true vertical depths for all markers and zones pertinent to this work.)

Obtained gas samples for radiochemical analysis:

1. C1 53 sks. cement plug in interval 5821' - 5954'. Unable to go deeper. Balanced
2. Perforated 8 holes in 10-3/4" casing each of following intervals 5801-03'; 5701-03'; 5601-03'; 5501-03'; 5401-03'; 5301-03'. Cut cable at 3190' and pulled.
3. Set retainer at 3368'. Pump in 200 bbls. of waste water and 160-bbls. waste mud followed by 766 bbls. fresh water and 1573 cu. ft. of 50/50 Poz cement with 2% gel and 0.4% HR-5.
4. Perforated 4 holes in 10-3/4" casing in following intervals: 3000-3001' and 1050-1100'. Pumped into perfs at 3000' without returns through perfs at 1050'. Pump into perfs at 1050' without returns at 3000'. Mixed 337 sks. of 50/50 Poz cement with 2% gel and 0.4% HR-5 and displaced below retainer.
5. Pumped 880 sks. cement inside of 10-3/4" casing from 1100-2910'. Picked up tubing to 1050' and pumped into perfs at 1050'. Pumped 880 sks. cement inside of 10-3/4" casing from 1051' to surface.
6. Welded plate on top. Poured concrete for monument and set bronze plaque.

18. I hereby certify that the foregoing is true and correct

SIGNED Miles Reynolds TITLE Vice President DATE January 25, 1977

(This space for Federal or State office use)

APPROVED BY W. Rogers TITLE DIRECTOR DATE FEB 2 1977

CONDITIONS OF APPROVAL, IF ANY:

## APPENDIX B

Mr. Travis King  
Austral Oil Company  
P. O. Box 259  
Lamesa, Texas 79351

Subject: Well Locations

Dear Mr. King,

We wish to thank you and Austral Oil Company for leaving the material listed below for our use. We also wish to express our appreciation for leveling both well locations and removing most of the trash that had accumulated at the well sites over the years. The insignificant pieces of scrap left in the area is of no consequence and does not merit further clean up.

The material left at our request is listed.

### Area 1

1. Electrical power line and telephone line
2. Wooden electrical backboards
3. Barbed wire fence and gate
4. Miscellaneous scrap

### Area 2

1. Concrete slab
2. Stock pile of pea gravel
3. Miscellaneous scrap

### Large Stack Area

1. Barbed wire fence and fencing material
2. Scrap lumber and sills

Mr. King, I understand the meter loop and base left on the power pole at the old C. P. site is also for my use. Please advise.

As you know, I purchased the forty acres surrounding both wells in September, 1976.

If I can be of any help to you in the future please contact me. My offer for a meal and a cup of coffee anytime you are in the area still stands.

Your friend,

*Cap Atwood*

Cap Atwood